

PROJECT SITUATION REPORT DISC Drill 2012-13 Season

Project: T-350-M

Project Principal Investigator: Dr. Charles Bentley

Report No. 10 for period: 1-13-13 **through:** 1-19-13

Prepared by: Kristina Dahnert **Date:** 1-20-13

IDDO PERSONNEL ONSITE: Patrick Cassidy
Kristina Dahnert
Dave Ferris
Jason Goetz
Josh Goetz
Mike Jayred
Jay Johnson
Nicolai Mortensen
Elizabeth Morton
Tanner Kuhl
Linda Morris (IDPO – arrived at WSD)

ACTIVITIES DURING PERIOD

- Pinned the outer housing of the replicate coring check valve to the inner portion of the housing to prevent the parts from shifting during use.
- Completed a camera run and dummy logging tool test of the third deviation. WOB varied only 24N through the deviation area. From the camera footage, it looks like most of the variation is due to stick-slip of the drill.
- Efforts continued this week to re-enter deviation 3B and the hole was successfully directed further away from the parent hole.
- When video footage verified that the 3B deviation had fully diverged from the parent hole, coring with a 1-meter core barrel and two screen configuration was initiated at a depth of 2223 meters and the deviation had fully diverged from the parent by 2242.76 meters. A third screen was subsequently added to allow for collection of full 1-meter cores.
- Drill configuration was changed to a 2-meter core barrel with six screens. The core barrel was again fitted with stabilizer pads and the side cutters were installed on the head to promote deviation away from the parent.
- Due to the side cutters orbiting slightly in the hole, attempting to cut their way off to the side, the outer surface of the cores had a barber pole pattern and texture. Chips would often fill the grooves left by the barber poling, making the cores difficult to push out of the barrel. The side cutters and barber poling also increased core diameter from 108mm to 109mm in one direction. Core quality was still deemed excellent by the core handlers.
- After sufficient angle in the deviation bore was attained, the side cutters were removed and the regular coring cutters were installed. The cores were then easily removed from the core barrel and the barber pole finish was eliminated.

- Linda Morris (IDPO) arrived at WAIS Divide on Monday, 1/14/13, and has been busy filming and photographing various operations onsite.
- The replacement encoder for the level wind motor was installed and reinserted into the control loop.
- It was noticed this week that an I-beam face on the level wind frame was deformed by approximately 0.5" due to the level wind carriage having run into the hard limit at some point in time. We are unsure if this occurred during this season or a previous season. No other damage is evident. The hard limit switches have been tested and are working properly. The only way the level wind should be able to hit the hard limit, with everything working properly, is if the level wind is run with the manual control station and the limit switch override button is held down.
- Coring of the third deviation was completed on Tuesday, 1/15/13, at a drillers' depth of 2290.797 meters.
- Initiated broaching operations at the fourth deviation site. The high side of the parent bore was now found to be at 85°. Broaching operations were continued until a 0.7° change in inclination was seen in the broaching notch. Approximately 0.1° of inclination is gained for every 12 broaching passes.
- Four crates were packed for retro and were returned to McMurdo for vessel shipment back to the U.S. this spring. The crates contained DISC Drill core barrel sections and sleeves, a variety of cabling, a spare transformer, hose and pipe fittings and spare Arctic Flexwing fluid hose.
- Crates used for the original shipment of the DISC Drill to WAIS Divide in 2007-2008 were inventoried and were found to be in good condition. This inventory will give us an idea of how many new crates will need to be fabricated prior to next season when the entire drill is broken down and packed for future traversing out of WAIS Divide and eventual return to Madison.
- Rebuilt the pocket on the cutter head that was damaged when the cutters were lost in the borehole.
- Mill/broaching hybrid operations were completed on the fourth deviation between 1948 meters and 1951.2 meters until an additional inclination delta of 0.3° was attained over that length.
- The milling head was then reconfigured with shoes, and a pad for the coring drill was created at 1952 meters.
- An attempt was made to drill the first core of the fourth deviation with a 2-meter core barrel and 5 screen configuration. While the drill was able to land on a ledge several times, the drill head would rotate off of the ledge when the cutter was turned on and the drill would return to the parent bore. An inclination of 5.35° was expected, but the longer drill configuration was only able to attain an inclination of 5.1° due to flex. Use of this configuration was aborted.
- The second coring attempt was made with a 1-meter core barrel and 3 screen configuration. An inclination of 5.54° was expected, with a better than expected actual reading of 5.64° recorded.
- The first core of the fourth deviation was drilled on Friday, 1/18/13. A 0.7m core was drilled, with a 40mm wide ledge at the top followed by the broaching ramp, which faded out just before the end of the core. The bottom of the core was full

108mm diameter. Marks were evident on the broach ramp where the 2-meter drill had been pushed up against it. The 2-meter drill had been able to reach over 60mm, but since there was no ledge, it was pushed back into the parent hole by the ramp.

- Due to the high inclination of the parent bore at this depth, coring on the fourth deviation will continue with a 1-meter and 4 screen configuration, as the longer drill cannot make the turn into the high side of the parent bore.

SAFETY

- Nothing to report

COMMENTS

(Problems, Concerns, Recommendations, Etc.)

- Masha Tsukernik presented a science lecture on Wednesday, 1/16/13, discussing cyclones in relationship to Antarctic weather.
- Mike Roberts, a mountaineer onsite for the POLENET group, presented an adventure lecture Friday, 1/18/13, discussing his “Guiding of the Seven Summits”, not the least of which includes Mt. Everest.
- With the 3-day drilling extension approved, drilling operations will now end on Thursday, 1/31/13. Pack up and close out will continue until Monday, 2/4/13, when the entire drill crew will return to McMurdo. All drillers are scheduled to fly back to Christchurch on Wednesday, 2/6/13.